

HOUSEHOLD SAFETY: PREVENTIVE MEASURES AND PROTECTIVE EQUIPMENT



HOUSEHOLD HAZARDOUS MATERIAL

Introduction

Many people who wear protective equipment when using hazardous materials at work will use the same materials at home without any type of protection even though the materials are just as dangerous or harmful at home as they are at work. This brochure provides information on how to prevent accidents, fires and contamination from hazardous materials at home and provides information about the different types of protective equipment which are available.

The type of protective equipment you need depends upon the type of hazardous material you will be exposed to or the physical danger you will encounter. Read the label of a product. If it contains a hazardous material, be sure that you are using the proper protective equipment. It is a good idea to read the contents label with each new purchase; manufacturers will occasionally change the formulation of their product. Too many people risk injury, poisoning and even cancer by using hazardous products without proper protection.

Complete protection may require a hard-hat, safety goggles or glasses, splash suit, gloves, respirator and safety shoes. Properly designed and fitted safety equipment should **not** be awkward to wear or use. Any time or money lost from using protective equipment and safety procedures is more than compensated for by avoiding costs from potential injury or sickness.

Accidents

An accident is an unplanned event resulting in either physical harm to an individual, damage to property, or both. An accident may be the result of an unsafe act (standing up in a boat) or an unsafe condition (a leaky boat). Often times these situations can be related. An unsafe act can result in an unsafe condition.

There are two approaches to eliminating accidents:

Eliminate unsafe conditions. Work areas and equipment should be examined to determine if any unsafe conditions (e.g., frayed electrical wires, improper ventilation or lighting, leaking containers of hazardous material) exist. Any unsafe condition should be corrected before beginning work in the area.

Reduce unsafe acts. Working in a safe environment requires you to examine those actions you control while being aware of those situations beyond your control. Care must be taken to be sure that any actions taken to protect or reduce accidents in one area do not cause or set up the conditions for accidents in some other area.

Chemical Hazards

A lot of products found in homes, gardens or garages have hazardous materials. Chemical hazards are classified as: combustible, flammable, corrosive, explosive, reactive and toxic. Some materials may exhibit more than one chemical hazard; they can be flammable/toxic or corrosive/combustible.

Read the label. Make sure that you understand what hazards are associated with a product's use or disposal. Look for signal words on the label, they are required to be on every product which contains a hazardous material. The signal word **"DANGER"** means that the product is extremely flammable, corrosive or highly toxic. If a material is highly toxic, the label must provide information on how to properly treat someone with an exposure to the product.

The signal word **"WARNING"** means moderately toxic, **"CAUTION"** means slightly toxic. Products with "Warning" and "Caution" words on the label are required to tell you how the product may be hazardous to humans and domestic animals. These statements will also make recommendations on how to avoid exposure by using protective clothing and adequate ventilation. However, specific types of protective clothing are not always adequately described, nor does the label explain how much ventilation is adequate. Products labeled "non-toxic" may indicate a safer product; however be aware that the word "non-toxic" is an advertising word and has no federal regulatory definition.

Whether the product is highly toxic or not, the label should state what type of exposure, if any, requires medical attention. If an exposure requires medical attention, call your local emergency number **(911)** or the **Regional Poison Center (1-800-542-6319)** for advice. When you call be prepared to provide medical personnel with information from the label. Emergency first aid procedures must be stated on the label; however, antidotes listed on the label are not always in keeping with current medical recommendations

Combustible. A material is combustible if it can be readily ignited (has a flashpoint greater than 100°F) and it can act as a fuel.

Flammable. A material is considered flammable if it has the ability to generate a sufficient concentration of combustible vapors under normal conditions to be ignited with a flashpoint less than 100°F.

Fuel (the material), oxygen and heat are required for a fire to occur, if you remove any of these three elements a fire can be extinguished.

Corrosive. Corrosion is the process of material degradation. A corrosive agent is a reactive compound or element that produces a destructive chemical change in a material (e.g., living tissue, metals, plastics or other matter) it is in contact with. Common corrosives are halogens (e.g., chlorine, fluorine, bromine, iodine), acids (e.g., sulfuric, nitric, hydrochloric) and bases (e.g., sodium hydroxide, potassium hydroxide, lye).

The pH or corrosiveness of a material is measured on a scale of 0-14, with 7 being neutral. A corrosive acid is a material with a pH of 2 or less; acidic chemicals have a pH range of 1-6. A corrosive base or caustic material has a pH of 12.5 or more; caustic chemicals have a pH range of 8-14.

Explosive. A material is considered explosive if it undergoes a very rapid chemical transformation producing large amounts of heat and gases when exposed to heat, sudden shock or pressure. A gas or vapor explosion is a very rapid, violent release of energy. The major factor contributing to an explosion is the confinement of flammable material. Confinement can

also enhance the explosive process. Poorly ventilated buildings, sewers and storage drums are examples of places where potentially explosive atmospheres may exist.

Reactive. A reactive material is a material that can undergo a violent or abnormal reaction. Such reactions can occur when a material is exposed to water (sodium metal) or under normal ambient atmospheric conditions (dimethyl zinc is a pyrophoric liquid which will ignite in air at or below normal room temperature).

Toxic/poisonous. Toxic or poisonous materials (e.g., arsenic, cyanide, mercury acetate, DDT) can cause injury or death. The dose, concentration, duration or frequency of exposure, and the route of exposure, are all factors effecting the toxicity of a material.

Chemical Exposure

Dose. All chemicals are toxic or poisonous, but it is the dose or the quantity of a material to which an organism is exposed which can separate a poison from a remedy. People do not react the same way to all chemicals. Some people may be hypersensitive (sensitive to a toxic agent in a smaller than normal dose) to a chemical, while others may be resistant and require a larger dose than normal to show an effect.

Concentration. The concentration of a particular material is the degree to which the material has or hasn't been diluted by additives, impurities or other contaminants.

Duration and Frequency. Duration is how long the exposure to a material is, frequency is how often the exposure occurred.

Route of exposure. The route by which a hazardous material enters the body can determine how much of the material is absorbed and which organs will be effected. The route may also effect the toxicity of the material; a chemical can be more toxic if inhaled then if it is absorbed through the skin. Hazardous materials may enter the body through:

Ingestion. Hazardous materials can enter your body from eating or drinking a hazardous material or eating or drinking contaminated food or water contaminated. The ingestion of most hazardous materials can be avoided by not putting anything in your mouth while working with hazardous materials; traces of hazardous chemicals can be carried from your hand to your mouth.

Always keep food, drinks or other items that could come into contact with your mouth (e.g. cigarettes) away from the work area to avoid contamination. [Cigarettes, matches or other smoking matter should not be used around hazardous materials because of the possibility of starting a fire or causing an explosion.] When you are finished working, remove any contaminated clothing and wash your hands and other exposed body parts thoroughly before eating, drinking or smoking.

Keep hazardous products in their original containers with labels intact and visible. Do not store hazardous materials near food or beverage items, and never place hazardous materials in food or beverage containers (children may not be able to read the label). Always keep hazardous products out of their reach and in locked areas.

Inhalation. Because hazardous materials can enter your body from breathing hazardous gases, vapors or sprays, good ventilation is essential when using hazardous products. Work outside whenever possible. If you must work inside, use a fan to direct air away from the work area and towards an open window. Be sure that you do not direct hazardous fumes or vapors toward others who may be working outside. Air conditioners do not provide sufficient ventilation because they only circulate air (even on vent) and do not remove contaminants.

Before using electricity in an enclosed area, open any doors or windows to clear the air. This will ensure that the area is free of hazardous fumes or vapors that could ignite or explode from an electrical spark. If you can smell the hazardous material you are working with, then ventilation is not sufficient (although not all hazardous chemicals have an odor, e.g., carbon monoxide, methyl alcohol) and you should use a mask or respirator for adequate protection.

Absorption. Hazardous material can enter your body from contact with your skin or other exposed body surfaces. Some hazardous material will cause damage to the skin before being absorbed into the bloodstream, while others can be absorbed without damaging the skin. Once inside the body, however, these materials can then cause acute or chronic effects to organs or tissues.

Acute effects are immediate and characterized by severe symptoms with a sudden onset. Skin burns from splashing battery acid is an example of acute effects.

Chronic effects are gradual and occur through repeated exposure over an extended period of time, the slow pollution of groundwater resulting from the disposal of small amounts of leftover herbicide down a sinkhole every growing season is an example of chronic effects.

Although there are many kinds of chronic health effects, the most common are:

- **Liver or kidney damage:** injury to organs that are primarily responsible for breaking down and getting rid of toxic materials in the body.
- **Central nervous system damage:** damage to nerve cells in the brain and spinal cord can be exhibited in minor ways such as depression or slight changes in I.Q., or can be as serious as paralysis.
- **Cancer:** abnormal cells that multiply and spread.
- **Birth defects:** Teratogens change the fetus as it is developing inside the mother. Mutagens modify the genetic makeup of organisms; if the mutation occurs in the sperm or egg cell, this change can be passed on to the baby and the baby's children.

For absorption to occur, a hazardous material must come into contact with your skin, eyes or other exposed body parts. To prevent this from happening, you should work to limit the possibility of spills, splashes or sprays of hazardous products from occurring and use the appropriate equipment (e.g., goggles, gloves, splashsuits) needed to provide you with adequate protection.

Other Factors. External and human factors which can also effect the type and severity of an exposure are:

- **External factors:** location, temperature, weather, wind direction and other environmental concerns.
- **Human factors:** age, weight, gender, genetics, immune system and other aspects of physical well being.

Protection

Body protection. Before determining the type and degree of protective clothing needed for proper protection, the physical, chemical and toxic properties of a hazardous material must be thoroughly assessed. The work function and probability of exposure to a hazardous material must also be considered when selecting protective clothing.

Protective clothing is available in a variety of styles (aprons, coveralls, splashsuits and fully encapsulating suits) and materials (natural rubber, synthetic rubber and plastic). If a hazard is minor, minimal protection is required. This could be a cloth, plastic or rubber coverall or apron. (If you use cloth work clothes, wash them separately in a washing machine with a full water level of hot water and detergent. Rinse the washing machine thoroughly after cleaning the contaminated clothes. Line dry the work clothes rather than using a dryer, the high heat of a dryer can ignite any flammable vapors remaining in the clothing.)

As the danger from a hazardous material increases, so does the required level of protection. **A splashsuit made of PVC is suitable for a corrosive liquid when there will be minimal contact with organic materials.** If the hazardous material is more toxic, then more protection must be used. Neoprene or butyl rubber splashsuits are good barriers against toxic hazards.

Protective clothing protects primarily because of the type of material used in making the clothes. In selecting the proper material choose one which is strong, durable, flexible, easy to decontaminate and chemical resistance. The most important aspect of a material is its chemical resistance. When protective clothing comes into contact with a hazardous material, it must be able to resist damage, penetration or permeation. Consult with a salesperson from your local safety equipment and clothing supply store or hardware store to determine what type of protective clothing meets your needs.

Wearing protective clothing can create a temperature problem. Someone enclosed in a plastic or rubber suit is shielded from the normal circulation of air needed to cool the body. If the body is unable to cool itself, then it is prone to heat stress including heat stroke. During extended periods of work when the body is unable to cool itself because of temperature, clothes or work schedule, the best method for "cooling" the body is to take frequent rest periods.

Ear protection. Ear plugs (the higher the decibel rating number on the package of earplugs the better the protection) or earmuffs should be worn if noise is a problem (e.g. impact tools, heavy machinery, and consistently loud or high-pitched sounds).

Eye protection. Eyes are particularly vulnerable to injury from hazardous products. Many hazardous products may cause eye damage if splashed into an eye or eyes (e.g., oven cleaners, drain openers, paint thinners). Wraparound safety goggles should be worn to protect the eyes from chemical splashes, mists and vapors, and to protect the eyes from scratches or cuts from metal burrs, rocks or other flying matter. Standard eyeglasses **do not** provide adequate protection from hazardous chemicals or flying matter. Safety goggles are inexpensive and can be purchased at safety supply stores or at many hardware stores.

DO NOT wear contact lenses (especially soft lenses) when working with hazardous products. The hazardous vapors or mists may be absorbed by the lenses and held against your eyes increasing the potential for damage to your eyes.

Foot protection. For foot protection against hazardous chemical liquids wear a boot made of PVC (plastic-polyvinyl chloride), neoprene, butyl rubber or some other chemical resistant material. Two styles of chemical resistant foot protection are available: pullover boots and shoes. For foot protection against physical accidents, such as falling items or cuts, heavy leather or steel toe and shank boots should be worn.

Hand protection. The skin on your hands and fingers are the areas most exposed to a hazardous material. When working with a hazardous material make sure that you use a glove that will protect your hand from contact with the hazardous material. **Nitrile (synthetic rubber) gloves are effective protection against most household products.** When selecting gloves, consider the thickness and cuff length. A thicker glove with longer cuffs provides better protection, but be sure that they are not so thick as to inhibit the required dexterity to complete the job. Consult with a salesperson from your local safety equipment and clothing supply store or hardware store to determine what type of glove meets your needs.

For extra protection, two pair of gloves may be worn. For heavy work, thick leather gloves may be worn to prevent the puncturing or tearing of the chemical protective gloves. If the thick leather work gloves become contaminated, they should be discarded; leather is difficult to decontaminate. For lighter jobs a pair of thin gloves (surgical gloves) may be worn inside the chemical protective gloves. This not only provides protection in case the outer glove is torn or permeated, but it will also add an extra layer of protection for the hands during the removal of the outer gloves and other contaminated protective clothing.

Shirt or splashsuit cuffs should be worn on the outside of protective gloves to prevent any of the hazardous material from leaking into the glove. If your work requires your hands to be elevated above your head, the cuffs of the shirt or splashsuit should be taped to the gloves to provide a proper seal.

Head protection. A hardhat is worn as the basic safety equipment for head protection. If you are doing any construction work at home you may want to add a hardhat to your list of protective equipment. Hardhats are adjustable so that a liner can be worn in cold weather. They also have chinstraps to secure the hardhat to the head when you are

bending, ducking or wearing a full-face respirator.

Manufacturers have adapted most hardhats to allow faceshields and ear protection to be attached. Faceshields attached to a hardhat can provide added protection. To prevent overhead splashes from running down the inside of the shield and splashing on your eyes or face, be sure that there are no gaps between the shield and the hardhat.

Respiratory protection. There are different types of masks and respirators you can use. Particle masks are inexpensive and provide minimal protection from dusts, but they are inadequate for use with products that can produce vapors, fumes or mists. A respirator may be required for products that can produce vapors, fumes or mists.

Respirator. The basic function of a respirator is to reduce the risk of respiratory injury from breathing airborne contaminants. An Air Purifying Respirator (APR) protects you by removing the contaminants from the air before you breathe it; an Atmosphere Supplying Respirator (ASR) protects you by supplying you with an alternative source of clean air to breathe. Some chemicals used for household projects may require a particle mask or an APR.

There are a wide variety of APR's available, but they generally fall into two main categories:

1. Particulate APR's have mechanical filtering elements and are used with aerosol spray paints, some pesticides or when in contact with dust from stone or woodwork or with fumes from soldering or welding; and,
2. Gas and vapor APR's have chemical absorbent (e.g., charcoal filters) cartridges and may be used with ammonia, pesticides, paint related materials, printing and photographic solvents, organic vapors and other hazardous chemicals.

The respirator should be NIOSH (National Institute for Occupational Safety and Health) approved for the particular contaminant to which you will be exposed. On all NIOSH approved respirators there will be an approval number consisting of the letters "TC" followed by two sets of letters and numbers (e.g., TC-23C-212).

A respirator should be comfortable and leak-proof. Different people have different face sizes, try on a respirator before you purchase it to make sure it fits properly. Men with face hair are not be able to get a good fit with a respirator and may not be adequately protected.

The filters and cartridges of reusable respirators have to be replaced regularly. If it is difficult to breathe, the filter is probably clogged and needs to be replaced. If you can smell the hazardous material through the respirator, then the chemical absorbent is probably used up and the cartridge will need to be replaced. If you rely on odor to determine when to replace your cartridge, be sure that the hazardous material is odor producing.

General rules of thumb are to replace the cartridges after two weeks, after eight hours of continuous work, or if you can smell the hazardous material. A way to avoid replacing filters and cartridges is to replace the whole respirator. There are disposable respirators on the market with hazardous material specific filters and cartridges in place. Consult with a salesperson from your local safety equipment and clothing

supply store or hardware store to determine what type of respirator will meet your needs.

Fire Hazards

When working with hazardous products, always read and follow the directions on the label. Do not mix products unless instructed to do so by the directions on the label. To prevent fumes from escaping, keep all containers closed when working with the hazardous material.

If the product is flammable and/or explosive, use it and store it away from any sources of heat, flames, sparks or ignitions. Gas pilot lights, hot water tanks, lit cigarettes and cigars, light switches and garage door openers can all be ignition sources. Fuel, oxygen and heat are required for combustion to occur, if you remove any of these three elements a fire can be extinguished.

Place all solvent covered rags in a sealed container after use and before cleaning. If you clean them yourself, wash the rags separately in a washing machine with a full water level of hot water and detergent. Rinse the washing machine thoroughly after cleaning the rags. Line dry the rags rather than using a dryer, the high heat of a dryer can ignite any flammable vapors remaining in the rags.

Install smoke detectors in your house and other areas where hazardous products are used, and always have two exits from the work area. Post a list of emergency phone numbers (fire, medical assistance, regional poison center, etc.) by your phone and inform home members about the list. If you have any large quantities of hazardous products at your home and there is a fire, be sure to notify the firefighters of the amounts and types of hazardous materials on site when they arrive.

Keep a working fire extinguisher readily available in your home and work area. Make sure the extinguisher you have is appropriate for the fire you are attempting to extinguish.

Fire extinguisher: The appropriate fire extinguisher depends upon the source of fire. A **Class A** fire extinguisher will extinguish ordinary combustibles such as paper, cloth, wood and upholstery. Solvents and grease fires require a **Class B** fire extinguisher and a **Class C** fire extinguisher is used for electrical fires. Using the wrong kind of fire extinguisher for a fire can be dangerous because it could cause the fire to spread. Most households contain each of these potential sources (combustibles, grease, and electrical), so an **ABC** or **Multi-purpose Dry Chemical** fire extinguisher is recommended. Since the chemical in a dry chemical extinguisher may settle, you should always shake the extinguisher before using it. Consult with a salesperson from your local safety equipment supply store or hardware store to determine which fire extinguisher meets your needs.

Check the pressure and contents of your fire extinguisher at the intervals suggested by the manufacturer. Take your fire extinguisher to be serviced and refilled each time it is discharged. A fire extinguisher that is empty, low on propellant or not working cannot protect you. Be sure that everyone in the house knows where the fire extinguisher is located and that those who *can* use it know *how* to use it.

For More Information Call:

- **1-360-397-6118 ext. 4016** *Clark County Solid Waste* provides information about household and business hazardous waste, waste reduction, recycling, composting and other solid waste issues.
- **1-360-696-8186** *Vancouver Solid Waste* provides information about waste reduction, recycling, composting and other solid waste issues.
- **Department of Ecology: 1-360-690-7171** *Vancouver Field Office* provides information on business generated waste and water quality issues.
- **1-360-407-6300** *24 Hour Emergency Spill Response* provides for the cleanup of chemical and hazardous waste spills and leaks.
- **1-800-633-7585** *Hazardous Substance Information Office* provides information about the proper disposal of business generated hazardous products/waste.
- **1-800-RECYCLE** *Recycle Hotline* provides information about recycling non-toxic products and the disposal of household hazardous waste products.

Additional Hazardous Material/Waste brochures are available from Clark County Department of Public Works. To obtain a copy of the following brochures call 397-6118 ext. 4352.

- *Household Hazardous Material – Product Labeling*
- *Household Hazardous Material – Purchasing, Storing and Disposing*
- *Household Hazardous Material – Household Safety: Preventive Measures and Protective Equipment*
- *Safer Alternatives: Reducing The Risk In The Garage*
- *Safer Alternatives: Reducing The Risk In The Home*
- *Safer Alternatives: Reducing The Risk In The Yard And Garden*
- *Household Hazardous Waste Disposal Program*
- *Get The Point: Be Safe With Your Used Syringes*
- *Clark County Recycling Directory*

Funding for the research and publication of this booklet was provided by Clark County and a grant from Washington State's Department of Ecology. This booklet, with minor changes, is taken from the manual Guide to Hazardous Products Around the Home. The manual is published by the Missouri State Household Hazardous Waste Project, which is administered by Southwest Missouri State University's Office of Continuing Education.

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